Extra Problems for Chapter 8

1. A student makes silver chloride according to the following equation:

$$2AgNO_3\ (s)\ +\ MgCl_2\ (aq)\ \rightarrow\ 2AgCl\ (s)\ +\ Mg(NO_3)_2\ (aq)$$

The student starts with 50.0 grams of $MgCl_2$ and an excess of $AgNO_3$. If she makes 125.1 g of AgCl, what is her percent yield?

2. A student performs the following chemical reaction:

$$2HCl\ (aq)\ +\ Ca(OH)_2\ (s)\ \rightarrow\ CaCl_2\ (aq)\ +\ 2H_2O\ (l)$$

He starts with 125 g of HCl and an excess of $Ca(OH)_2$. If he has an 85.6% yield, how many grams of $CaCl_2$ did he end up making?

3. Which of the following are empirical formulas?

a. N_2O_4 b. HNO_3 c. C_4H_{10} d. K_2CO_3 e. $C_6H_6O_3$

4. For any chemical formula in #3 that is not an empirical formula, what is the empirical formula for that compound?

5. A compound has an empirical formula of CH_2 and a molar mass of 56.12 g. What is its molecular formula?

6. A 115.0-g sample of iron (Fe) is burned in excess oxygen. The result is a pure solid with a mass of 164.5 grams. What is the empirical formula of the solid?

7. A gaseous hydrocarbon (a molecule containing only carbon and hydrogen) is burned in a combustion analysis experiment. If 150.0 grams of gas produce 412.6 grams of carbon dioxide and 337.9 grams of water, what is the empirical formula?

8. A 25.0-g sample of an unknown substance was burned in excess oxygen to produce 47.8 grams of carbon dioxide and 29.3 grams of water. There was no other product. What is the empirical formula of the unknown substance?

9. What is the percent composition for each element in $KClO_3$?

10. A sample of an unknown substance is decomposed and found to be 59% strontium (Sr), 8.0% carbon, and 33% oxygen. What is the empirical formula?

11. Give the chemical formulas for the following substances:

a. ammonium oxide b. sodium sulfate c. magnesium phosphate d. cobalt (II) carbonate